



# The National Center for Post-Traumatic Stress Disorder

## PTSD RESEARCH QUARTERLY

VOLUME 13, NUMBER 2

ISSN 1050-1835

SPRING 2002

### PSYCHOSOCIAL CONSEQUENCES OF DISASTERS

Fran H. Norris Ph.D.

National Center for PTSD and  
Georgia State University

The literature on the psychosocial consequences of disasters is extensive. It is interdisciplinary and scattered across a variety of journals and books. Disasters are difficult to study well, and much of the research is flawed. Even very good studies cannot be definitive. No matter how sophisticated, one study cannot tell us that disasters have (or do not have) implications for mental health, only that the particular disaster under study had (or did not have) an effect on that particular population in that particular place. This simple fact is often forgotten in practice, and the reader should beware of over-generalized interpretations of specific results. Review articles and meta-analyses play an especially critical role in this field because they can ask: *How large are the effects of disasters on mental health, generally? What types of events have the strongest effects, on average? For whom are they most stressful, usually?* Unfortunately, even very good reviews (e.g., Rubonis & Bickman, 1991) have a limited life because the answers to these questions change as the research base evolves. Believing that the need to re-examine these questions was acute, my colleagues and I recently attempted to provide a new synthesis of the empirical research. Our empirical review (Norris et al., in press) incorporated findings from 160 samples and 102 disasters worldwide. The conclusions from that detailed review provided a framework for this brief one. With apologies to all of those whose work was omitted here, I have tried to select articles that reflect the diversity of events, people, and places that have been studied and that illustrate a method, trend, issue, or conclusion that is important in the field, overall.

Methodological heterogeneity complicates interpretation of this body of work but adds to its depth and breadth. Some studies provide detailed diagnostic data collected from profoundly traumatized disaster victims (e.g., North et al., 1999), whereas others provide survey data collected from large samples that are more geographically representative but include sizable proportions of persons who were less severely exposed (e.g., Garrison et al., 1995). School-based studies and needs assessments form another important category (e.g., March et al., 1997). Timeframes also vary considerably, with first assessments occurring as early as immediately postdisaster to as late as 7 years postdisaster. Only

1 in 3 studies are longitudinal in design, pointing to a need for further research that examines how effects and prevalence rates change over time. These methodological variations should be kept in mind when reading this research.

A fundamental issue for any review is establishing the boundaries for the phenomenon of interest. I adopted a working definition of a disaster as a sudden event that has the potential to terrify, horrify, or engender substantial losses for many people simultaneously. Even the most cursory reading of this literature will show that investigators quickly make distinctions between *natural disasters*, which result from weather or geophysical forces, and *human-caused disasters*, which result from human negligence and error (*technological disasters*) or actual intent to harm (*mass violence*). Rightly or wrongly, I omitted research on displacement and terrorism that occurs in the context of ongoing political conflict or war but did include research on single, dramatic episodes of mass violence, such as shooting sprees or peacetime terrorist attacks.

Natural disasters have been studied most frequently. Rates of psychopathology have been minimal after some natural disasters but substantial after others. Although composing only a small fraction of the total body of work, the abstracted studies were selected to provide a good cross-section of quality research. Illustrating an array of agents and locations, the studied disasters include the 1980 eruption of Mount St. Helens in Washington State (Shore et al., 1986), the 1981 floods in Kentucky (Norris et al., 1994), Hurricane Andrew in south Florida (LaGreca et al., 1996), Hurricane Mitch in central America (Caldera et al., 2001), the Sarno, Italy landslides (Catapano et al., 2001), the Newcastle earthquake (Carr et al., 1997), and the Armenian earthquake (Armenian et al., 2000; Goenjian et al., 1995).

Technological disasters can symbolize the callousness or carelessness of powerful others. The classic study of Gleser et al. (1981) on the consequences of the 1972 dam collapse in Buffalo Creek, West Virginia, is required reading for anyone entering the field of disaster research. More than 20 years old now, the work remains timely and thought-provoking. The investigators documented a wide range of psychological outcomes for both adults and children and were far ahead of their time in considering family dynamics. Subsequent research conducted 14 years postevent showed that PTSD

Published by:

The National Center for PTSD  
VA Medical and Regional  
Office Center (116D)  
215 North Main Street  
White River Junction  
Vermont 05009-0001 USA

☎ (802) 296-5132  
FAX (802) 296-5135

Email: [ptsd@dartmouth.edu](mailto:ptsd@dartmouth.edu)  
<http://www.ncptsd.org>

Subscriptions are available  
from the Superintendent of  
Documents, P.O. Box 371954,  
Pittsburgh, PA 15250-7954.

#### Editorial Director

Matthew J. Friedman,  
MD, PhD

#### Scientific Editor

Paula P. Schnurr, PhD

#### Managing Editor

Fred Lerner, DLS

#### Production Manager

Peggy Willoughby

#### Circulation Manager

Sandra Mariotti

#### In this issue:

- Psychosocial Consequences of Disasters
- PILOTS Update

#### National Center Divisions

Executive  
White River Jct VT 05009

Behavioral Science  
Boston MA 02130

Clinical Laboratory  
Menlo Park CA 94304

Clinical Neurosciences  
West Haven CT 06516

Evaluation  
West Haven CT 06516

Pacific Islands  
Honolulu HI 96813

Women's Health Sciences  
Boston MA 02130



Address for Dr. Norris: Georgia State University, Department of Psychology, University Plaza, Atlanta, GA 30303-3083. Email: [FNorris@gsu.edu](mailto:FNorris@gsu.edu).

remained prevalent long after the community was destroyed (Green et al., 1990). The 1979 nuclear accident at Three Mile Island (TMI) generated much interest. Baum and colleagues (1983) showed a range of cognitive, behavioral, and physiological consequences of the accident; Bromet et al. (1990) called attention to the distress experienced by mothers of young children after disasters of this type. Transportation accidents on land, in the air, or at sea form an important class of technological disasters. A series of excellent articles (e.g., Yule et al., 2000) described the effects of the sinking of the *Jupiter* cruise ship. Rates of PTSD and other psychological disorders were very high among adolescent survivors of this horrible incident well into adulthood. Very often after technological disasters, responders who must handle the dead, treat the injured, or counsel the bereaved are studied; Epstein et al.'s (1998) study of health-care workers after the Ramstein Air Show Disaster is a fine example of this type of research.

On average, disasters of mass violence have greater impact on mental health than either natural or technological events. When destruction, harm, and death are intentional, they are particularly difficult for survivors to make sense of. Nader and colleagues' (1990) study of a school sniper attack and North and colleagues' (1997) study of a cafeteria shooting spree showed that the psychological consequences of life threat and proximity to death could be severe and long-lasting. In recent years, two events of mass violence – the 1995 bombing of the Murrah federal building in Oklahoma City and the 2001 terrorist attacks on the World Trade Center in New York City – captured international attention. Among survivors of the Oklahoma bombing, rates of PTSD and other psychological problems were striking (North et al., 1999); the impact of this research on the subsequent assessment of needs in New York City cannot be overstated.

Its type is not the only factor that influences a disaster's overall impact. Where the disaster occurs is also critical. On average, natural disasters in developing countries have more severe consequences than either natural or technical disasters do in developed countries (Norris et al., in press). Studies of the Mexico City earthquake (de la Fuente, 1990), the Armenian earthquake (e.g., Goenjian et al., 1995), and Hurricane Mitch (e.g., Caldera et al., 2001) illustrate the profound trauma and bereavement that may occur when disasters strike areas of the world where housing, warning systems, and resources for recovery are poor.

Even within samples that have experienced the same disaster, individuals vary greatly in their outcomes. Severity of exposure is nearly always predictive of postdisaster symptoms. Very often such effects are described as "dose-response" functions, meaning simply that as the severity of exposure increases, either mean symptom level or probability of disorder increases in a regular pattern. In the abstracted studies, individual-level stressors that affected mental health included bereavement, injury to self or family member, life threat, horror, property damage, and financial loss. That disasters are experienced collectively is perhaps their defining feature yet little research captures the implications of this for mental health. For a multi-county study of

flood victims in Kentucky, Norris et al. (1994) used archival data to create a measure of "community destruction" that was independent of respondents' self-reported "personal loss." Community destruction explained significant variance in postdisaster psychological, physical, and social functioning even after the effects of predisaster functioning and personal loss were controlled. Personal loss was associated most strongly with *increases* in *negative* affect, community destruction with *decreases* in *positive* affect. Such changes do not constitute psychopathology but do suggest that disasters harm the entire community's quality of life, which will be manifest in prevalent, though subclinical, expressions of stress. New evidence emerging from lower Manhattan provides recent support for the value of public health perspectives regarding disaster effects (Galea et al., 2002).

Survivors' characteristics, such as their gender and age, predisaster mental health and personality traits, and postdisaster psychosocial resources, also influence their outcomes. Steinglass and Gerrity's (1990) studies were particularly influential in calling attention to women as a high-risk group. In a cross-cultural study of Hurricanes Andrew and Paulina, Norris and colleagues (2001) showed that the magnitude of gender effects varied across cultures (Mexican being greater than Anglo-American, which was greater than African-American) in predictable ways according to the strength of male and female roles in those cultures.

Findings for age are complex. On average, samples composed of school-aged children show greater psychological impairment after disasters than do samples of adults. Interest in children has increased tremendously in the past decade of disaster research, a welcome and important change. LaGreca et al.'s (1996) longitudinal study of young children and Warheit et al.'s (1996) prospective study of adolescents exposed to Hurricane Andrew are particularly good examples of research on youth.

Although older adults are often presumed to constitute a high-risk group, the research does not support this. More often, younger and especially middle-aged adults are at greater risk for postdisaster symptomatology than older adults. Thompson and colleagues' (1993) study is illustrative of this point. Following Hurricane Hugo, age interacted with most stressors (e.g., life threat, injury, loss) such that middle-aged persons experienced the highest levels of disaster-related symptoms of depression, anxiety, and post-traumatic stress. Of different explanations tested, the burden perspective had the most explanatory power.

Regardless of whether they are assessed retrospectively or prospectively, predisaster symptoms are almost always among the strongest predictors of postdisaster symptoms. McFarlane's (1989) study of firefighters after the Ash Wednesday bushfires is illustrative of research that has explored the role of predisposing factors in depth.

Over the past 20 years, a large body of research has accumulated showing that psychosocial resources, such as hardiness, perceived control, and social support, afford critical protection for disaster victims (Norris et al., in press). Benight's work (e.g., Benight et al., 1999) on the

importance of coping self-efficacy is a fine example, in part because it fostered theory in this field (which more often is atheoretical in tone) and in part because his findings appear to have significant implications for intervention.

An important trend in disaster research over the past decade has been the recognition that the protection afforded by psychosocial resources is limited because resources are themselves vulnerable to the impact of disasters. Like Benight's work, work in this area attempts to import theory into our understanding of disaster-related stress. Two studies were critical in bringing the idea of resource loss to center stage. Freedy and colleagues (1992) tested hypotheses derived from Hobfoll's theory of Conservation of Resources. In his original test, and several subsequent ones, Freedy showed that postdisaster resource loss (assessed globally across a range of resources) is a potent predictor of postdisaster distress. Kaniasty and Norris (1993) introduced a more specific theory, the "social support deterioration model." In their initial test, as well as in subsequent ones that have spanned 6 disasters in 3 countries, declines in perceived social support and social embeddedness explained much of the mental health consequences of natural disasters. Palinkas et al. (1993) showed that the Exxon Valdez oil spill had significant impact on the social environments of the stricken communities.

Where do we go from here? It is clearly time to move beyond the "dose-response" paradigm that (rightly so far) has dominated the field. The evidence on this point is extensive and conclusive. Far more work is needed on family and community processes that foster resilience or impede recovery. We know much more about survivors' problems than we do about how to solve them. It is essential that we develop evidence-based methods of treatment and intervention that are appropriate in the context of disasters. Notwithstanding the critical importance of clinical treatments for the minority of disaster victims who develop PTSD and other psychological disorders, we cannot focus solely on individual treatments because disasters affect whole families, whole communities. Moreover, disasters often occur in areas where few mental health professionals are available to provide such care. The most critical need may be to learn more about processes that halt, or even reverse, the erosion of disaster victims' intrapersonal and interpersonal resources that enable them to care for themselves and each other.

## SELECTED ABSTRACTS

BENIGHT, C. C., SWIFT, E., SANGER, J., SMITH, A., & ZEPPELIN, D. (1999). **Coping self-efficacy as a mediator of distress following a natural disaster.** *Journal of Applied Social Psychology*, 29, 2443-2464. Social-cognitive theory and conservation-of-resources theory were utilized to understand individual differences in psychological response to natural disaster. Coping self-efficacy, lost resources, social support, and optimism were assessed along with demographic variables in predicting distress following Hurricane Opal. Participants included 67 residents of Okaloosa County, Florida. Multiple regression analyses indicated that coping self-efficacy was the strongest predictor of

general distress and trauma-related distress. Loss of resources and gender were also important predictors of general distress. Path analyses demonstrated that lost resources directly influenced general distress, social support, optimism, and coping self-efficacy. These analyses also indicated that coping self-efficacy perceptions mediated the relationships between loss of resources and trauma-related distress, social support and both trauma and general distress, and optimism and both types of distress. Theoretical implications are discussed.

BROMET, E. J., PARKINSON, D. K., & DUNN, L. O. (1990). **Long-term mental health consequences of the accident at Three Mile Island.** *International Journal of Mental Health*, 19(2), 48-60. The present paper reexamines the findings on mental morbidity from our NIMH-sponsored research by shifting the focus from general mental/emotional distress to three specific aspects of symptomatology — depression, anxiety, and hostility. We shall look at three high-risk groups: mothers of young children living within ten miles of the plant, workers employed at Three Mile Island when the accident occurred, and community mental health patients residing within ten miles of the plant. Data are presented regarding temporal patterns of symptoms of depression, anxiety, and hostility and of episodes of major depression or anxiety. [Adapted from Text].

CARR, V. J., LEWIN, T. J., WEBSTER, R. A., & KENARDY, J. A. (1997). **A synthesis of the findings from the Quake Impact Study: A two-year investigation of the psychosocial sequelae of the 1989 Newcastle earthquake.** *Social Psychiatry and Psychiatric Epidemiology*, 32, 123-136. This paper summarises the major findings from the Quake Impact Study (QIS), a four-phase longitudinal project that was conducted in the aftermath of the 1989 Newcastle (Australia) earthquake. A total of 3,484 subjects participated in at least one component of the QIS, comprising a stratified sample of 3,007 drawn from community electoral rolls and 477 from specially targeted supplementary samples (the injured, the displaced, the owners of damaged businesses, and the helpers). Subjects' initial earthquake experiences were rated in terms of weighted indices of exposure to threat and disruption. Psychological morbidity was measured at each phase using the General Health Questionnaire (GHQ-12) and the Impact of Event Scale (IES). Selected findings and key conclusions are presented for each of six areas of investigation: service utilisation during the first 6 months post-disaster; patterns of earthquake experience and short-term (6-month) psychosocial outcome; earthquake exposure and medium-term (2-year) psychosocial outcome; vulnerability factors and medium-term psychosocial outcome; specific community groups at increased risk (e.g., the elderly and immigrants from non-English-speaking backgrounds); the effects of stress debriefing for helpers. Threshold morbidity (i.e. likely caseness) rates are also presented for a broad range of subgroups. In addition to presenting an overview of the QIS, this paper synthesises the major findings and discusses their implications for future disaster management and research from a mental health perspective.

EPSTEIN, R. S., FULLERTON, C. S., & URSANO, R. J. (1998). **Posttraumatic stress disorder following an air disaster: A prospective study.** *American Journal of Psychiatry*, 155, 934-938. *Objective:* The purpose of this study was to determine predictors of PTSD in health care workers exposed to a disaster, in order to facilitate early case identification and prevention of subsequent morbidity. *Method:* Following an air disaster, 355 military medical health care workers were studied over an 18-month follow-up period. Measures included assessment of peritraumatic reactions



associated with the disaster, the frequency of other stressful events after the disaster, and standard PTSD rating scales at 6, 12, and 18 months. *Results:* Multivariate logistic regression of data on health care workers who cared for victims of the air disaster showed that PTSD was more likely to develop in those who had not completed college, those who had worked with burn victims, those who had experienced more stressful life events in a period of approximately 6 months following the disaster, and those who experienced emotional numbness immediately after the disaster. *Conclusions:* Results suggest that lower levels of education, exposure to grotesque burn injuries, stressful life events following exposure, and feelings of numbness following exposure are useful predictors of subsequent development of PTSD.

FREEDY, J. R., SHAW, D. L., JARRELL, M. P., & MASTERS, C. R. (1992). **Towards an understanding of the psychological impact of natural disasters: An application of the Conservation Resources stress model.** *Journal of Traumatic Stress, 5*, 441-454. The current study employed the Conservation of Resources (COR) stress model as a template for understanding short-term adjustment following a natural disaster. The following three hypotheses were supported: resource loss was positively related to psychological distress; resource loss was relatively more important in predicting psychological distress than personal characteristics and coping behavior; and, resource loss constitutes a risk factor for the development of clinically significant psychological distress. The theoretical importance of the current findings is discussed, particularly the tendency within disaster literature to confound crisis experiences (e.g., terror) with resource loss experiences (e.g., loss of possessions, loss of social support) when defining degree of disaster exposure. Also, the practical importance of considering resource loss in planning intervention services is highlighted.

GALEA, S., AHERN, J., RESNICK, H., KILPATRICK, D., BUCUVALAS, M., GOLD, J., & VLAHOV, D. (2002). **Psychological sequelae of the September 11 terrorist attacks in New York City.** *New England Journal of Medicine, 346*, 982-987. *Background:* The scope of the terrorist attacks of September 11, 2001, was unprecedented in the United States. We assessed the prevalence and correlates of acute PTSD and depression among residents of Manhattan five to eight weeks after the attacks. *Methods:* We used random-digit dialing to contact a representative sample of adults living south of 110th Street in Manhattan. Participants were asked about demographic characteristics, exposure to the events of September 11, and psychological symptoms after the attacks. *Results:* Among 1008 adults interviewed, 7.5% reported symptoms consistent with a diagnosis of current PTSD related to the attacks, and 9.7% reported symptoms consistent with current depression (with "current" defined as occurring within the previous 30 days). Among respondents who lived south of Canal Street (i.e., near the World Trade Center), the prevalence of PTSD was 20.0%. Predictors of PTSD in a multivariate model were Hispanic ethnicity, two or more prior stressors, a panic attack during or shortly after the events, residence south of Canal Street, and loss of possessions due to the events. Predictors of depression were Hispanic ethnicity, two or more prior stressors, a panic attack, a low level of social support, the death of a friend or relative during the attacks, and loss of a job due to the attacks. *Conclusions:* There was a substantial burden of acute PTSD and depression in Manhattan after the September 11 attacks. Experiences involving exposure to the attacks were predictors of current PTSD, and losses as a result of the events were predictors of current depression. In the aftermath of terrorist attacks, there may be substantial psychological morbidity in the population.

GLESER, G. C., GREEN, B. L., & WINGET, C. (1981). *Prolonged psychosocial effects of disaster: A study of Buffalo Creek.* New York: Academic Press. The disaster dealt with in this book took place on February 26, 1972, when a slag dam collapsed, inundating the valley of Buffalo Creek, West Virginia. A lawsuit filed on behalf of more than 600 men, women, and children for whom psychic impairment was claimed necessitated interviews by mental health professionals retained by each side in the case. These data, supplemented by information from self-report instruments concerning current symptoms, sleep problems, family disruption, and dream reports, form the data base for the detailed investigation reported here. From this extensive information there emerges a well-rounded description of the behavioral and emotional upheaval still evident in this population when the interviews were conducted 2 years after the traumatic event. Follow-up studies extend the data on some individuals to as long as 5 years postflood, assessing the impact of the legal settlement.

GOENJIAN, A. K., PYNOOS, R. S., STEINBERG, A. M., NAJARIAN, L. M., ASARNOW, J. R., KARAYAN, I., GHURABI, M., & FAIRBANKS, L. A. (1995). **Psychiatric comorbidity in children after the 1988 earthquake in Armenia.** *Journal of the American Academy of Child and Adolescent Psychiatry, 34*, 1174-1184. *Objective:* To determine current rates of PTSD, depressive disorder, and separation anxiety disorder (SAD) among children 11 1/2 years after the 1988 earthquake in Armenia; to determine current rates of comorbid PTSD and depressive disorder; and to assess the contribution of exposure, gender, loss of family members, and loss of residence. *Method:* 218 school-age children from 3 cities at increasing distances from the epicenter were evaluated using the Child Posttraumatic Stress Disorder Reaction Index, the Depression Self-Rating Scale, and the section on SAD from the Diagnostic Interview for Children and Adolescents. *Results:* On the basis of these evaluations, high rates of current PTSD, depressive disorder, and their co-occurrence were found among victims residing in the two heavily impacted cities. SAD was comparatively less frequent, although symptoms of SAD had been pervasive throughout the region. Severity of posttraumatic stress and depressive reactions were highly correlated. Extent of loss of family members was independently correlated with each. *Conclusion:* After a catastrophic natural disaster, children are at risk for comorbid PTSD and secondary depression. Based on the findings, an interactive model is proposed of postdisaster psychopathology. Early clinical intervention is recommended to prevent chronic posttraumatic stress reactions and secondary depression.

GREEN, B. L., LINDY, J. D., GRACE, M. C., GLESER, G. C., LEONARD, A. C., KOROL, M., & WINGET, C. (1990). **Buffalo Creek survivors in the second decade: Stability of stress symptoms.** *American Journal of Orthopsychiatry, 60*, 43-54. A follow-up study of 120 adult survivors of the Buffalo Creek dam collapse of 1972 showed group changes 14 years after the event. Decreased symptoms were noted in all areas, although significant psychopathology remained in about one-quarter of the survivors. A small group with delayed onset of symptoms was identified.

KANIASTY, K., & NORRIS, F. H. (1993). **A test of the social support deterioration model in the context of natural disaster.** *Journal of Personality and Social Psychology, 64*, 395-408. This prospective longitudinal study examined stress-mediating potentials of 3 types of social support: social embeddedness, perceived support from nonkin, and perceived support from kin. As participants in a statewide panel study, 222 older adults were interviewed once before and twice after a severe flood. It was hypothesized that social support would mediate the relationship between

esized that disaster exposure (stress) would influence depression directly and indirectly, through deterioration of social support. LISREL analyses indicated that postdisaster declines in social embeddedness and nonkin support mediated the immediate and delayed impact of disaster stress. No evidence was found for the mediational role of kin support. Findings are in accord with conceptualizations of social support as an entity reflecting dynamic transactions among individuals, their social networks, and environmental pressures.

LA GRECA, A. M., SILVERMAN, W. K., VERNBERG, E. M., & PRINSTEIN, M. J. (1996). **Symptoms of posttraumatic stress in children after Hurricane Andrew: A prospective study.** *Journal of Consulting and Clinical Psychology*, 64, 712-723. The authors examined symptoms of posttraumatic stress in 3rd-5th grade children during the school year after Hurricane Andrew. From a conceptual model of the effects of traumatic events, 442 children were evaluated 3, 7, and 10 months postdisaster with respect to (a) their exposure to traumatic events during and after the disaster, (b) their preexisting demographic characteristics, (c) the occurrence of major life stressors, (d) the availability of social support, and (e) the type of coping strategies used to cope with disaster-related distress. Although symptoms of PTSD declined over time, a substantial level of symptomatology was observed up to 10 months after the disaster. All 5 factors in the conceptual model were predictive of children's PTSD symptoms 7 and 10 months postdisaster. Findings are discussed in terms of the potential utility of the model for organizing thinking about factors that predict the emergence and persistence of PTSD symptoms in children.

MCFARLANE, A. C. (1989). **The aetiology of post-traumatic morbidity: Predisposing, precipitating and perpetuating factors.** *British Journal of Psychiatry*, 154, 221-228. A group of 469 firefighters were studied 4, 11 and 29 months after having an extreme exposure to a bushfire disaster. The relative importance of the impact of the disaster, personality and ways of coping were investigated as determinants of post-traumatic morbidity. Neuroticism and a past history of treatment for a psychological disorder were better predictors of post-traumatic morbidity than the degree of exposure to the disaster or the losses sustained. These results raise doubts about the postulated central aetiological role a traumatic event plays in the onset of morbidity.

NADER, K., PYNOOS, R., FAIRBANKS, L., & FREDERICK, C. (1990). **Children's PTSD reactions one year after a sniper attack at their school.** *American Journal of Psychiatry*, 147, 1526-1530. 14 months after a sniper attack at an elementary school, level of exposure to that event remained the primary predictor of ongoing posttraumatic stress reactions in 100 schoolchildren who were followed up. Guilt feelings and knowing the child who was killed were associated with a greater number of symptoms. Grief reactions occurred independent of degree of exposure to the event. The authors discuss the public health implications of these longitudinal findings.

NORRIS, F. H., FRIEDMAN, M. J., WATSON, P. J., BYRNE, C. M., DIAZ, E., & KANIASTY, K. (in press). **60,000 disaster victims speak, Part I: An empirical review of the empirical literature, 1981 - 2001.** *Psychiatry*. Results for 160 samples of disaster victims were coded as to sample type, disaster type, disaster location, outcomes and risk factors observed, and overall severity of impairment. In order of frequency, outcomes included specific psychological problems, nonspecific distress, health problems, chronic

problems in living, resource loss, and problems specific to youth. Samples were more likely to be impaired if they were composed of youth rather than adults, were from developing rather than developed countries, or experienced mass violence (e.g., terrorism, shooting sprees) rather than natural or technological disasters. Most samples of rescue and recovery workers showed remarkable resilience. Within adult samples, more severe exposure, female gender, middle age, ethnic minority status, secondary stressors, prior psychiatric problems, and weak or deteriorating psychosocial resources most consistently increased the likelihood of adverse outcomes. Among youth, family factors were primary. Implications of the research for clinical practice and community intervention are discussed in a companion article (Norris, Friedman, & Watson, in press).

NORRIS, F.H., PERILLA, J.L., IBAÑEZ, G.E., & MURPHY, A.D. (2001). **Sex differences in symptoms of posttraumatic stress disorder: Does culture play a role?** *Journal of Traumatic Stress*, 14, 7-28. If gender differences in PTSD follow from culturally-defined roles and rules, they should be greater in societies that foster traditional views of masculinity and femininity than in societies that adhere to these traditions less rigidly. Data were collected 6 months after Hurricanes Paulina (Acapulco;  $N=200$ ) and Andrew (Miami; White  $n=135$ ; Black  $n=135$ ). In regression analyses predicting scores on the Revised Civilian Mississippi Scale, Sex X Cultural group interactions emerged for the total scale and for subscales of Intrusion, Avoidance, and Remorse. Only a sex main effect (women higher) emerged for Arousal. Overall, the results indicated that Mexican culture amplified, whereas African American culture attenuated, differences in the posttraumatic stress of male and female disaster victims.

NORTH, C. S., SMITH, E. M., & SPITZNAGEL, E. L. (1997). **One-year follow-up of survivors of a mass shooting.** *American Journal of Psychiatry*, 154, 1696-1702. *Objective:* This report describes a 1-year follow-up study of survivors of a mass shooting incident. Acute-phase data from this incident were previously reported in this journal. *Method:* The Diagnostic Interview Schedule/Disaster Supplement was used to assess 136 survivors at 1 to 2 months and again a year later, with a 91 percent reinterview rate. *Results:* In the acute postdisaster period, 28% of subjects met criteria for PTSD, and 18% of subjects qualified for another active psychiatric diagnosis. At follow-up, 24% of subjects reported a history of postdisaster PTSD (17% were currently symptomatic), and 12% another current psychiatric disorder. Half (54%) of all 46 individuals identified as having had PTSD at either interview were recovered at follow-up, and no index predictors of recovery were identified. There were no cases of delayed-onset PTSD (beyond 6 months). Considerable discrepancy in identified PTSD cases was apparent between index and follow-up. Inconsistency in reporting, rather than report of true delayed onset, was responsible for all PTSD cases newly identified at 1 year. The majority of subjects with PTSD at index who were recovered at follow-up reported no history of postdisaster PTSD at follow-up, suggesting considerable influence of fading memory. *Conclusions:* This study's findings suggest that disaster research that conducts single interviews at index or a year later may overlook a significant portion of PTSD. The considerable diagnostic comorbidity found in this study was the one robust predictor of PTSD at any time after the disaster. Disaster survivors with a psychiatric history, especially depression, may be most vulnerable to developing PTSD and therefore may deserve special attention from disaster mental health workers.

NORTH, C. S., NIXON, S. J., SHARIAT, S., MALLONEE, S., MCMILLEN, J. C., SPITZNAGEL, E. L., & SMITH, E. M. (1999). **Psychiatric disorders among survivors of the Oklahoma City bombing.** *Journal of the American Medical Association*, 282, 755-762. *Objective:* To measure the psychiatric impact of the bombing of the Alfred P. Murrah Federal Building in Oklahoma City on survivors of the direct blast, specifically examining rates of PTSD, diagnostic comorbidity, functional impairment, and predictors of postdisaster psychopathology. *Design, Setting, and Participants:* Of 255 eligible adult survivors selected from a confidential registry, 182 (71 percent) were assessed systematically by interviews approximately 6 months after the disaster, between August and December 1995. *Main Outcome Measures:* Diagnosis of 8 psychiatric disorders, demographic data, level of functioning, treatment, exposure to the event, involvement of family and friends, and physical injuries, as ascertained by the Diagnostic Interview Schedule/Disaster Supplement. *Results:* 45% of the subjects had a postdisaster psychiatric disorder and 34.3% had PTSD. Predictors included disaster exposure, female sex (for any postdisaster diagnosis, 55 percent vs 34 percent for men; chi-square (1) = 8.27;  $P=.004$ ), and predisaster psychiatric disorder (for PTSD, 45% vs 26% for those without predisaster disorder; chi-square (1) = 6.86;  $P=.009$ ). Onset of PTSD was swift, with 76 percent reporting same-day onset. The relatively uncommon avoidance and numbing symptoms virtually dictated the diagnosis of PTSD (94% meeting avoidance and numbing criteria had full PTSD diagnosis) and were further associated with psychiatric comorbidity, functional impairment, and treatment received. Intrusive reexperience and hyperarousal symptoms were nearly universal, but by themselves were generally unassociated with other psychopathology or impairment in functioning. *Conclusions:* Our data suggest that a focus on avoidance and numbing symptoms could have provided an effective screening procedure for PTSD and could have identified most psychiatric cases early in the acute postdisaster period. Psychiatric comorbidity further identified those with functional disability and treatment need. The nearly universal yet distressing intrusive reexperience and hyperarousal symptoms in the majority of nonpsychiatrically ill persons may be addressed by nonmedical interventions of reassurance and support.

PALINKAS, L. A., DOWNS, M. A., PETTERSON, J. S., & RUSSELL, J. (1993). **Social, cultural, and psychological impacts of the Exxon Valdez oil spill.** *Human Organization*, 52, 1-13. The sociocultural and psychological impacts of the Exxon Valdez oil spill were examined in a population-based study of 594 men and women living in 13 Alaskan communities approximately one year after the spill occurred. A progressive "dose-response" relationship was found between exposure to the oil spill and the subsequent cleanup efforts and the following variables: reported declines in traditional social relations with family members, friends, neighbors and coworkers; a decline in subsistence production and distribution activities; perceived increases in the amount of and problems associated with drinking, drug abuse, and domestic violence; a decline in perceived health status and an increase in the number of medical conditions verified by a physician; and increased post-spill rates of generalized anxiety disorder, PTSD, and depression. Alaskan Natives, women, and 18-44 year olds in the high- and low-exposed groups were particularly at risk for the three psychiatric disorders following the oil spill. The results suggest that the oil spill's impact on the psychosocial environment was as significant as its impact on the physical environment. The results also have important theoretical and pragmatic implications for the understanding and mitigation of adverse impacts of long-term processes of sociocultural change.

RUBONIS, A. V., & BICKMAN, L. (1991). **Psychological impairment in the wake of disaster: The disaster-psychopathology relationship.** *Psychological Bulletin*, 109, 384-399. The present review examines the relationship between disaster occurrence and psychopathology outcome for 52 studies that used quantitative measures of such a relationship. Descriptive and inferential techniques were used to examine relationships among four sets of variables: (a) the characteristics of the victim population, (b) the characteristics of the disaster, (c) study methodology, and (d) the type of psychopathology. A small but consistently positive relationship between disasters and psychopathology was found. The distribution of effect-size estimates was significantly heterogeneous, and this heterogeneity was partially accounted for by methodological characteristics of the research. When controlling for methodology, victim and disaster characteristics also contributed variance to the disaster-psychopathology relationship. Implications for future research are outlined in view of these results.

THOMPSON, M. P., NORRIS, F. H., & HANACEK, B. (1993). **Age differences in the psychological consequences of Hurricane Hugo.** *Psychology and Aging*, 8, 606-616. At 12, 18, and 24 months after Hurricane Hugo, 831 adults were interviewed regarding their disaster-related stressors and present psychological state. The study's purposes were to assess whether age influenced one's vulnerability to postdisaster stress and to evaluate four different perspectives on disaster recovery that have been previously used to explain age differences. Regression analyses demonstrated that disaster exposure had substantial and pervasive psychological effects. The analyses also revealed a curvilinear interaction between disaster exposure and age. Younger people exhibited the most distress in the absence of disaster, but middle-aged people did so in its presence. Differential exposure, resources, and inoculation all failed to explain these differences; however, the burden perspective had considerable explanatory power.

YULE, W., BOLTON, D., UDWIN, O., BOYLE, S., O'RYAN, D., & NURRISH, J. (2000). **The long-term psychological effects of a disaster experienced in adolescence: I: The incidence and course of PTSD.** *Journal of Child Psychology and Psychiatry and Allied Disciplines*, 41, 503-511. Previous studies have shown that children and adolescents exposed to traumatic experience in a disaster can suffer from high levels of post-traumatic stress. The present paper is the first a series reporting on the long-term follow-up of a group of young adults who as teenagers had survived a shipping disaster — the sinking of the "Jupiter" in Greek waters — between 5 and 8 years previously. The general methodology of the follow-up study as a whole is described, and the incidence and long-term course of PTSD. It is the first study of its kind on a relatively large, representative sample of survivors, using a standardised diagnostic interview, and comparing survivors with a community control group. Survivors of the Jupiter disaster ( $N = 217$ ), and 87 young people as controls, were interviewed using the Clinician Administered PTSD Scale (CAPS). Of the 217 survivors, 111 (51.7%) had developed PTSD at some time during the follow-up period, compared with an incidence in the control group of 3.4% ( $N = 87$ ). In the large majority of cases of PTSD in the survivors for whom time of onset was recorded, 90% ( $N = 110$ ), onset was not delayed, being within 6 months of the disaster. About a third of those survivors who developed PTSD (30%,  $N = 111$ ) recovered within a year of onset, through another third (34%,  $N = 111$ ) were still suffering from the disorder at the time of follow-up, between 5 and 8 years after the disaster. Issues relating to the generalisability of these findings are discussed.



## ADDITIONAL CITATIONS

### Annotated by the Editor

ARMENIAN, H.K., MORIKAWA, M., MELKONIAN, A.K., HOVANESIAN, A.P., HAROUTUNIAN, N., SAIGH, P.A., AKISKAL, K., & AKISKAL, H.S. (2000). **Loss as a determinant of PTSD in a cohort of adult survivors of the 1988 earthquake in Armenia: Implications for policy.** *Acta Psychiatrica Scandinavica*, 102, 58-64.

Compared 154 cases of PTSD without comorbid psychiatric disorder and 583 nonpsychiatric controls. Higher education, being accompanied at the moment of the earthquake, and making friends after the earthquake were protective factors, whereas amount of destruction and loss were risk factors.

BAUM, A., GACHEL, R.J., & SCHAEFFER, M.A. (1983). **Emotional, behavioral, and physiological effects of chronic stress at Three Mile Island.** *Journal of Consulting and Clinical Psychology*, 51, 565-572.

One year after the Three Mile Island disaster, assessed 38 survivors and 83 controls from communities that had either no plant, a coal-fired plant, or an undamaged nuclear plant. Relative to controls, the TMJ residents reported more psychological symptoms, had poorer performance on behavioral measures of stress, and had higher levels of urinary catecholamines.

BRIERE, J., & ELLIOTT, D. (2000). **Prevalence, characteristics, and long-term sequelae of natural disaster exposure in the general population.** *Journal of Traumatic Stress*, 13, 661-679.

Assessed a community sample of 935 adults, 22% of whom reported exposure to a natural disaster. Physical injury, fear of death, and property loss were better than disaster type at predicting symptoms. Disaster exposure predicted symptoms even when exposure to interpersonal violence was statistically controlled.

CALDERA, T., PALMA, L., PENAYO, U., & KULLGREN, G. (2001). **Psychological impact of the hurricane Mitch in Nicaragua in a one-year perspective.** *Social Psychiatry and Psychiatric Epidemiology*, 36, 108-114.

Assessed 496 adult primary care patients 6 months after exposure to Hurricane Mitch. PTSD symptoms were related to the death of a relative, house destruction, female gender, prior mental health problems, and illiteracy.

CATAPANO, F., MALAFRONTI, R., LEPRE, F., COZZOLINO, P., ARNONE, R., LORENZO, E., TARTAGLIA, G., STARACE, F., MAGLIANO, L., & MAJ, M. (2001). **Psychological consequences of the 1998 landslide in Sarno, Italy: A community study.** *Acta Psychiatrica Scandinavica*, 104, 438-442.

Assessed a random sample of 272 adults exposed to a landslide 1 year after the vent. Compared with adults from an unaffected town, the exposed adults were more likely to have PTSD and other psychological symptoms.

DE LA FUENTE, J. R. (1990). **The mental health consequences of the 1985 earthquakes in Mexico.** *International Journal of Mental Health*, 19(2), 21-29.

Assessed 573 adult earthquake survivors who were housed in temporary shelters due to the destruction caused by the earthquake. Almost one third met criteria for PTSD, and 20% reported at least a moderate emotional reaction. Depression and generalized anxiety disorder also were common.

GARRISON, C. Z., BRYANT, E. S., ADDY, C. L., SPURRIER, P. G., FREEDY, J. R., & KILPATRICK, D. G. (1995). **Posttraumatic stress disorder in adolescents after Hurricane Andrew.** *Journal of the American Academy of Child and Adolescent Psychiatry*, 34, 1193-1201.

Conducted telephone interviews with a random sample of 158 Hispanic, 116 black, and 104 white adolescents in high- and low-impact areas 6 months after a hurricane. PTSD was associated with female sex, older age, nonwhite race, fear for self or other during the storm, personal or social resource loss, lifetime exposure to other traumatic events, and life events after the hurricane.

MARCH, J. S., AMAYA-JACKSON, L., TERRY, R., & COSTANZO, P. (1997). **Posttraumatic symptomatology in children and adolescents after an industrial fire.** *Journal of the American Academy of Child and Adolescent Psychiatry*, 36, 1080-1088.

Assessed 1,019 children in a community that experienced a serious industrial fire. Risk factors for PTSD included female sex, non-white race, and a higher amount of exposure to the fire.

NORRIS, F. H., PHIFER, J. F., & KANIASTY, K. (1994). **Individual and community reactions to the Kentucky floods: Findings from a longitudinal study of older adults.** In R. J. Ursano, B. G. McCaughey, & C. S. Fullerton (Eds.), *Individual and community responses to trauma and disaster: The structure of human chaos* (pp. 378-400). Cambridge: Cambridge University Press.

Assessed older adults (primary victims, secondary victims, nonvictims) before and after a flood. There were mild but long-lasting effects on psychological and physical well-being. Middle-aged adults were most strongly affected by loss, compared with old adults. Individuals with no prior flood exposure were more strongly affected than were those with prior flood experience.

SHORE, J. H., TATUM, E. L., & VOLLMER, W. M. (1986). **Psychiatric reactions to disaster: The Mount St. Helens experience.** *American Journal of Psychiatry*, 143, 590-595.

Randomly sampled 138 adults with high exposure to the Mount St. Helens disaster, 410 with low exposure, and 477 controls, approximately 3-3.5 years after the disaster. Using retrospective measures of onset, the investigators found that lifetime prevalence of single-episode depression, generalized anxiety disorder, and PTSD increased sharply during the disaster for the high-exposure group relative to the other groups.

STEINGLASS, P., & GERRITY, E. (1990). **Natural disasters and post-traumatic stress disorder: Short-term versus long-term recovery in two disaster-affected communities.** *Journal of Applied Social Psychology*, 20, 1746-1765.

Assessed 78 women and 77 men who had been relocated following exposure to a tornado or a flood. Although symptoms decreased over time, symptoms were higher in women than in men at both times, and symptoms also differed between disaster types.

WARHEIT, G. J., ZIMMERMAN, R. S., KHOURY, E. L., VEGA, W. A., & GIL, A. G. (1996). **Disaster related stresses, depressive signs and symptoms, and suicidal ideation among a multi-racial/ethnic sample of adolescents: A longitudinal analysis.** *Journal of Child Psychology and Psychiatry and Allied Disciplines*, 37, 435-444.

Used path analysis to examine predictors of suicidal ideation among 4,978 adolescents who were exposed to a hurricane that occurred while they were taking part in an ongoing longitudinal study. Post-hurricane depression was the best predictor of post-hurricane suicidal ideation.

## PILOTS UPDATE

There is an extensive literature on the psychosocial consequences of disasters, with more than 1100 publications listed in the PILOTS database. In this column we present some suggestions for searching this literature effectively.

For best results, use our controlled vocabulary, which consists of 31 descriptors from the PILOTS Thesaurus and over 100 names of specific disasters contained in our Incidents Term List. This enables you to find the information you need regardless of the particular terminology employed in each individual publication.

The PILOTS Thesaurus contains the descriptors we use to categorize disasters. Under **Natural Disasters** we use 12 narrower terms: **Avalanches, Blizzards, Earthquakes, Epidemics, Famine, Floods, Hurricanes, Landslides, Lightning, Tornados, Tsunamis, and Volcanos**. Under **Technological Disasters** we use these narrower terms: **Building Collapse, Explosions** (and the subterm **Landmines**), **Fires, Nuclear Accidents, Toxic Contamination** (and the subterms **Agent Orange** and **Nuclear Testing**).

You can find a systematic presentation of the PILOTS Thesaurus on our website at [www.ncptsd.org/research/pilots/Thesaurus\\_2.html](http://www.ncptsd.org/research/pilots/Thesaurus_2.html). The entire Thesaurus, including a detailed alphabetical index, may be found in the *PILOTS Database User's Guide*. This 288-page book may be consulted online or downloaded from [www.ncptsd.org/research/pilots/User's Guide.pdf](http://www.ncptsd.org/research/pilots/User's Guide.pdf).

Unfortunately, the search software employed by the Dartmouth College Information System, which hosts the PILOTS database, does not offer the ability to "explode" a search — that is, it is not possible to instruct the database to search simultaneously for a descriptor and its narrower terms. To ensure that your search retrieves all the literature on a subject, it is necessary to enter all the relevant descriptors. If you want to find *all* the literature on natural disasters, you would have to enter thirteen descriptors.

To make it simpler for users to perform such searches, we have placed several detailed search expressions on our

website. These "hedges" (as professional database searchers call them) can be copied from [www.ncptsd.org/research/pilots/hedges.html](http://www.ncptsd.org/research/pilots/hedges.html) and pasted into the "Advanced Search" box on your screen.

When you see the "PILOTS Catalog - Basic Search" screen on your computer monitor, scroll down until you see the green "Advanced Search" button and click on that to bring up the "Advanced Search" box. Then just paste the appropriate hedge into the box and click on the "Submit Search" button.

Perhaps you want to narrow your search, rather than broaden it. The PILOTS database allows you to find publications dealing with the psychosocial consequences of a specific disaster. When we index such a publication, we not only assign it the appropriate descriptor from the PILOTS Thesaurus, but also assign a term for the specific incident. To standardize these terms, we maintain an Incidents Term List. By using terms from this list we ensure that all the literature on a particular incident can be found by using a single term, regardless of how many different names occur in the literature.

To find publications on a specific disaster, look in the Incidents Term List (which is on pages 185-186 of the *PILOTS Database User's Guide*, or on our website at [www.ncptsd.org/research/pilots/Incidents-List.html](http://www.ncptsd.org/research/pilots/Incidents-List.html)) for the appropriate term and use that term as if it were a descriptor from the PILOTS Thesaurus.

Because the PILOTS database treats these terms as descriptors, you can use Boolean operators to link them together with other descriptors. (The *User's Guide* explains how to do this.) In this way you could search for publications on coping behavior among survivors of the Jupiter Cruise Ship Sinking or on the epidemiology of PTSD among young survivors of Hurricane Andrew.

Whether you are studying past disasters or dealing with the immediate aftermath of a new one, the PILOTS database can help you to learn from the experiences of those who have worked with the survivors of similar incidents.

National Center for PTSD (116D)  
VA Medical and Regional Office Center  
215 North Main Street  
White River Junction, Vermont 05009-0001

**Return Service Requested**

First Class Presort US Postage Paid Permit No 726 Concord, NH
---